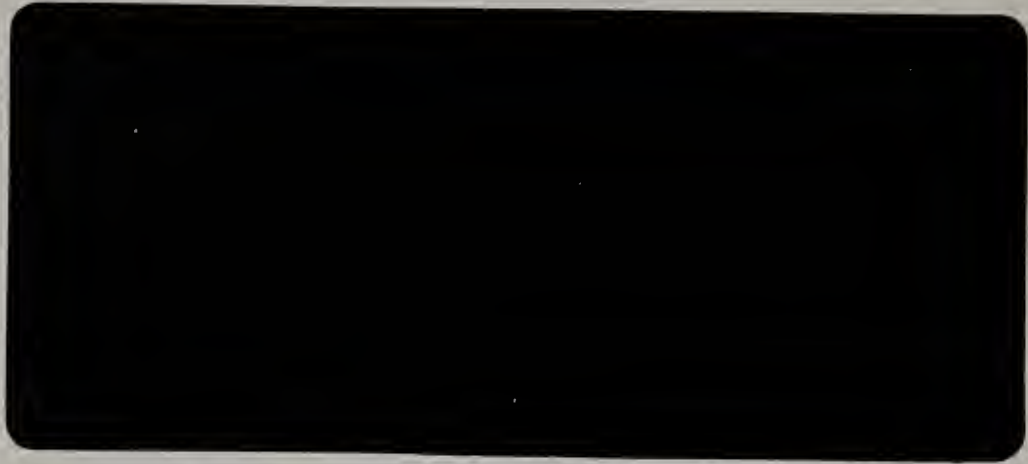


OAK HILL SCHOOL
Conducted by
The Connecticut Institute for the Blind

Piano Tuning
Curriculum Guide

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Acknowledgments

The revision of the Piano Tuning Curriculum Guide, which was conducted during the summer of 1968, was funded under Title I of the Elementary and Secondary Education Act and by The Connecticut Institute for the Blind.

Foreword

This piano technicians' curriculum contains all the fundamental aspects of piano technology excepting the area performed by piano rebuilders. Sound board repair or replacement, pin block replacement and case refinishing cannot be included because of time restrictions. This guide is based on one 40 minute period a day for the first and second year and two periods a day for the third and fourth year. Each year is divided into four quarters or marking periods and the average pupil should be able to cover the work outlined. Tuning requires a great deal of practice, and as much time as possible should be secured after school hours to fill this need. It is generally conceded that the average student cannot properly tune a piano for a concert artist until he has tuned a thousand pianos. Because this is impossible during the four year period, it will be necessary for the student to secure employment by a dealer upon graduation. In this apprentice capacity, he can gain the experience necessary to start him on the road to a prosperous and fulfilling career.

One of the most important aspects of the piano technician's work lies in the ability to communicate with his customer. He must be equipped with factual information such as a history of the instrument, acoustical properties of various surroundings,

proper placement of the piano in the home, and above all, the effect of climatic conditions on the wood structure. He must be conscious of the customer's love for his instrument, be it a concert grand or the cheapest spinet. The music lover who buys a cheap instrument must have confidence in that instrument or he would not have made the purchase. The utmost skill is demanded from the technician to tune such a piano and have it please the owner.

It is strongly recommended that the student have one year of combined key board and theory training. These subjects, being offered by the music department, are not included in this outline.

The primary evaluation is of great importance. A student who pursues the course without some measure of talent will soon be lost and unhappy. This evaluation is not foolproof but should be of help in determining the student's ability to cope with the problems at hand.

Throughout the curriculum, diagnosis must be stressed. Much time is lost as a result of a faulty diagnosis. The classic example is the T.V. repairman who dismantles the set only to find the plug defective.

Timing is another factor. No piano should require more than two hours to tune. With this in mind, the instructor should stress speed without loss of accuracy.

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The text of this outline refers to the "action" as upright, studio upright, or console. Spinet and grand actions are treated separately.

The primary work done in key covering in the first year has been introduced mainly to give the student a relief from the monotony of tuning unisons. This type of approach has been considered throughout so as to keep the interest of the student at a high level. Many of these procedures, we realize, may not be achieved to perfection as this guide cannot, under the time allocated, produce a finished technician. However, the average student will be equipped for average work -- the superior student will be able to carry on superior work upon graduation.

Use of the term "tension regulator" in place of "tuning hammer" is applied throughout this outline. The name "tuning hammer" given this tool is extremely misleading, especially to the young student. A novice might actually try to use it as a hammer. "Tuning lever" is not appropriate as it is not a lever. "Tension regulator" exactly labels the tool for its designed function.

Upon graduation from high school, the student would do well to affiliate himself with the Piano Technicians' Guild. This organization would welcome his membership in the category of apprentice. In this capacity the student will have the opportunity to be in close contact with craftsmen of long experience. This association will enable the student to take advantage of the countless methods and materials that are in a constant state of development.

Your attention is called to the various operations that are performed in a fashion unique to the blind, such as string tracing, action removal, flange bushing, grand action regulating, leveling keys, etc. These operations have been outlined in detail to aid the sighted teacher. These skills can be achieved by the visually handicapped but the method is vitally important. In this same area, the student must be impressed with other manifestations such as extreme concern for the finish of the case as well as sundry household furnishings. Travel ability and personal appearance are equally important. A tuner is generally going to be doing his work with only the housewife in his presence. Moral character is therefore of paramount importance. To be successful the student must possess

1. Technical knowledge
2. Outstanding performance
3. Pleasing personality
4. Travel ability
5. High moral character
6. Good business sense

This is a large order but it must be done if the visually handicapped technician is to compete with his sighted peers.

James W. Hayes

Anthony Rozek

I. Primary Evaluation (8th Grade)

A. Mechanical dexterity

1. Demonstrate ability to use hand and power tools
2. Demonstrate ability to sort mixed screws
3. Demonstrate ability to discern various textures
4. Recognition of types of wood and metal
5. Demonstrate ability to lift object of reasonable weight and girth

B. Aural discrimination

1. After reasonable exposure be able to recognize the existence of beats
2. After reasonable exposure be able to recognize various intervals
3. Results of audiometer test be reviewed by instructor

I. General Objectives

A. 1st Year

1. Examination of case
2. String tracing
3. Unison tuning
4. Action removal

B. 2nd Year

1. Tuning
 - a. Octave
 - b. Pure intervals
 - c. Altered intervals
2. Historical background
3. Elementary stringing'
4. Repair of key
5. Mechanics of action
6. Familiarity with catalogue
7. Methods of measurement
8. String replacement
9. Trap work

C. 3rd Year

1. Tuning
 - a. Setting a temperament
 - b. Octave stretching and shrinking
 - c. Raising pitch
2. Pin setting
3. Flange pinning

4. Damper regulation
5. General action repair
6. Lubricants
7. Chemicals
8. Polishes

D. 4th Year

1. Tuning all types of pianos
2. Grand action regulating
3. Spinet action regulating
4. Key leveling
5. Hammer installation
6. Sales and record keeping

1st Year --- 1st QuarterI. Specific Objectives

A. Nomenclature of case

1. Examination of lid
 - a. Method of fastening
 - b. Method of supporting when raised
 - c. Method of removing when necessary
2. Examination of music rack
 - a. Method of fastening
 - b. Method of support
 - c. Method of removal
 - (1). Care in handling to avoid damage
 - d. Attention given to placement when detached from piano
 - e. Method of replacement
 - (1). Security of associated hardware
3. Examination of fall board and key slip
 - a. Method of fastening
 - b. Method of removal
4. Examination of bottom board
 - a. Method of fastening
 - b. Method of support
 - c. Method of removal
5. Examination of key bed
 - a. Method of support

6. Examination of back posts
7. Examination of sound board and ribs
8. Examination of trusses

B. String tracing

1. Examination of divisions of the plate
 - a. Various arrangements of tuning pins
 - b. Various arrangements of hitch pins
 - c. Styles of pressure bars
 - (1). Placement of agraffes
 - d. Tension support capability of the plate
 - (1). Tension amount of approximately 17 tons
 - e. Explanation of plate material
2. Explanation of tri-chords, bi-chords, and single strings
 - a. Explanation of plain wire
 - b. Explanation of wound strings
3. Path of strings over bridge
 - a. Examination and purpose of bridge pins
4. Explanation and purpose of over stringing
5. Tracing strings to tuning pins and making proper identification

II. Evaluation

A. Oral

1. Nomenclature

B. Performance

1. Demonstration of tracing ability

1st Year --- 2nd Quarter

I. Specific Objectives

A. Explanation of various types of pianos

1. Standard upright
2. Studio upright
3. Console
4. Spinet
5. Grand piano of various sizes
 - a. Explanation of measurement of grand piano
6. Square grand

B. Explanation of tension regulator (tuning hammer)

1. Proper hand position for tuning
2. Proper hand position for location of tuning pins
3. Explanation of various tips
4. Explanation of various heads
5. Application of tension regulator to tuning pins
 - a. Feel of tuning pins without string
 - b. Feel of tuning pins with string
6. Explanation and possible use of extension

C. Unison tuning

1. Introduction of rubber wedge
2. Tuning
 - a. Long string to middle
 - b. Shifting of wedge
 - c. Short string to middle
 - d. Unison tuning performed above temperament section as far as the break
 - e. Tuning short or long string to remaining two

II. Evaluation

A. Oral

1. Description of piano styles

B. Performance

1. Demonstration of tension regulator technique
2. Demonstrating shifting of mute
3. Demonstration of attempt to unison tune

1st Year --- 3rd QuarterI. Specific Objectives

A. Tuning

1. Unisons from C28 to F#58

B. Elementary key covering work

1. Preparation of key top

2. Use of adhesives
 - a. Water soluble types
 - b. Contact cement
 - c. Duco cement
3. Tools
 - a. Small plane
 - b. End cutting nippers
 - c. Various files
 - d. Various clamps

II. Evaluation

A. Oral

1. Description of adhesives
2. Description of tools

B. Performance

1. Demonstration of unison tuning C28 - F#58
2. Demonstration of simple key covering

1st Year --- 4th Quarter

I. Specific Objectives

A. Tuning

1. Octave tuning above and below temperament
2. Continued unison work

B. Trap work (introduction)

1. Nomenclature
2. Lubricants used

C. Action removal

1. Upright
2. Studio upright
3. Console

D. Cleaning

1. Removal of keys
 - a. Vacuum of key bed
 - b. Procedure of cleaning bottom
 - c. Procedure of cleaning action

II. Evaluation

A. Oral

1. Trap nomenclature
2. Lubricants of trap work

B. Performance

1. Demonstrate removal of action
2. Removal and replacement of keys
3. Demonstrate cleaning procedure
4. Replacement of action

2nd Year --- 1st QuarterI. Specific Objectives

A. Tuning

1. Unison tuning to lowest bi-chord and up to C76
2. Octave tuning from A1 to C76

B. Historical background

1. Resource material

- a. The Pianoforte, W. L. Sumner, MacDonald & Co., Ltd., Gulf House, 2 Portman St., London W.1., 1966.
- b. Let's Tune Up, John W. Travis, 8012 Carrol Ave., Tahoma Park, Ind., 20012

C. Elementary stringing

1. Study of stringing model

- a. Wind coil on tuning pin
- b. Tail making
- c. Application of string to hitch pin
- d. Application of double string

D. Key structure and repair

1. Study of capstan and purpose

- a. Need for polishing
- b. Need for rigidity

2. Key button

- a. Replacement and proper positioning
- b. Easing and tightening of bushing

3. Balance pin hole

- a. Repair of enlarged hole

4. Front key bushing

- a. Easing of bushing
- b. Tightening of bushing
- c. Replacement of bushing

5. Balance and front rail pins
 - a. Polishing and lubricating
6. Key binding
 - a. File at appropriate place
7. Square up and level individual keys
8. Space keys
9. Tighten guide and balance pins in rails
10. Turn guide pins to fit bushing
 - a. Observation of oval guide pin
11. Installing Jiffy key leads
12. Key covering
 - a. Application of ivory head, tail, and front
 - b. Application of plastic material
 - c. Proper trimming and edging of material
 - d. Application of sharp
- E. Tools for stringing on model
 1. T hammer
 2. Spacer and coil lifter
 3. Appropriate pliers and cutters
 4. Pin setter
- F. Tools for key work
 1. Key easing pliers
 2. Capstan wrench
 3. Files (bastard)
 4. Key spacer
 5. Bushing wedges

II. Evaluation

A. Written

1. Historical background
2. Key nomenclature
3. Tool nomenclature
4. Stringing nomenclature

B. Performance

1. Tuning unisons and octaves
2. Stringing
 - a. Tail making
 - b. Application of string to model
3. Key work
 - a. Replacement of key button
 - b. Replacement of key covering
 - c. Replacement of key bushing
 - d. Alignment of keys

2nd Year --- 2nd Quarter

I. Specific Objectives

A. Tuning

1. Unisons to F81
2. Octaves to F81
3. Pure major thirds
4. Use of strip mute
5. Permanent identification of C40 tuning pin
 - a. Front rail punching inserted on long string

B. Study of action model

1. Nomenclature of all parts
2. Study of mechanical action
3. Cause and effects of possible defects
4. Location of all fasteners
5. Affect of each regulating point

C. Tools required for action regulating

1. Nomenclature of standard regulating tools
 - a. Spring adjusting hook
 - b. Regulating screw-drive
 - c. Spoon bender
 - d. Damper regulator
 - e. Long tweezers
 - f. Long thin screwdriver for damper blocks
2. Technique of using regulating tools
 - a. Ease key
 - b. Level key and check dip (complete leveling covered in 4th year)
 - c. Tighten flanges
 - d. Check and correct action center
 - e. Space hammers
 - f. Check for proper placement of all springs
 - g. Check for proper placement of regulating rail
 - h. Position hammer rail to insure hammer travel
 - i. Adjust capstans
 - j. Regulate let off

- k. Regulate back check
- l. Regulate bridle wire
- m. Regulate damper spoon

D. Case work

- 1. Location of all fasteners

II. Evaluation

A. Written

- 1. Action nomenclature
- 2. Regulating tool nomenclature

B. Performance

- 1. Tuning
 - a. Unisons and octaves
 - b. Pure major thirds
- 2. Regulating
 - a. Affect of regulating points
 - b. Location and tightening of fasteners
 - c. Freedom of all moving parts
- 3. Understanding of mechanical action
- 4. Case work
 - a. Demonstrate location of fasteners

2nd Year --- 3rd QuarterI. Specific Objectives

A. Tuning

1. Pure fifths and fourths
2. Octaves and unisons to C88
3. Tuning forks - A-440 - C523.3
 - a. Proper handling
 - b. Matching of single string to fork

B. Supply catalogues

1. Knowledge of various suppliers
2. General procedure for ordering
3. Educational benefit of catalogue examination

C. Gauges

1. Familiarization of music wire gauge
 - a. Knowledge of sizes used in piano wire
 - b. Relationship of music wire numbering to decimal equivalent
2. Familiarization of center and tuning pin gauge
 - a. Relationship of center pin numbering to decimal equivalent
 - b. Relationship of tuning pin numbering to decimal equivalent
 - c. Use of the micrometer

II. Evaluation

A. Written

1. Write an order for one dozen items from supply catalogue

B. Performance

1. Tuning

- a. Octaves and unisons to C88
- b. Pure fifths and fourths

2. Gauges

- a. Measurement of various wire, center pin and tuning pin sizes

2nd Year --- 4th Quarter

I. Specific Objectives

A. Tuning

1. Tempering intervals

- a. Expand major third intervals
- b. Contract fifth intervals
- c. Expand fourth intervals
- d. Expand major sixth intervals

B. Stringing

1. Splicing

2. Installation of double string in extremes of treble
3. Proper bushing or replacement of tuning pins
4. Use of extractor or E-Z Out to remove tuning pin
5. Proper spacing of strings

C. Trap work

1. Adjustment
2. General repair
3. Application of lubricant to upper and lower friction points

II. Evaluation

A. Performance

1. Tuning
 - a. Demonstrate ability to expand and contract intervals
2. Stringing
 - a. Safe and correct procedure to install strings
 - b. Replacement and/or rebushing tuning pins
 - c. Extraction of broken tuning pin
3. Trap work
 - a. Lubricate and adjust all necessary parts of pedal assembly

3rd Year --- 1st QuarterI. Specific Objectives

A. Tuning

1. Study of pattern and proofs in temperament
2. Beginning of actual setting of temperament
3. Continued octave and unison tuning

B. Stringing

1. Installation of single bass string
2. Twisting of bass string; need for, and proper method
3. Installation of double string in lower notes of middle section

C. Action work

1. Flange pinning
 - a. Removal of old pin
 - b. Measurement of old pin
 - c. Inspection of bird's eye
 - d. Inspection of flange bushings
 - e. Fitting of new pin to bird's eye
 - f. Fitting of flange bushings to new pin
 - g. Insertion of new pin
 - h. Cutting of ends
 - i. Filing of ends

2. Flange pinning tools

- a. Reamer
- b. Burnisher
- c. Center pin gauge
- d. Nippers
- e. Punch
- f. File (fine mill)
- g. File (rat tail)

3. Whippen

- a. Nomenclature
- b. Repairing
 - (1). Re-gluing jack flange
 - (2). Replacing jack spring
 - (3). Installation of repair clip on bottom of whippen
 - (4). Alignment of bridle wire
 - (5). Alignment of back check
 - (6). Inspection of whippen cushion

D. Felting

- 1. Capstan screw felt
- 2. Regulating button punching
- 3. Back check felt
- 4. Damper lever felt
- 5. Spring seat felt of hammer butt and damper lever
- 6. Hammer butt felt
- 7. Hammer rail felt

8. Back stop felt
9. Spring rail felt
10. Hammer rail blocking felt

II. Evaluation

A. Oral

1. Nomenclature of whippen parts
2. Nomenclature of flange parts
3. Nomenclature of flange pinning tools

B. Performance

1. Tuning
 - a. Setting of temperament

3rd Year --- 2nd Quarter

I. Specific Objectives

A. Tuning

1. Continued practice of temperament
2. Continued practice of unisons and octaves
3. Octave stretching and purpose of
4. Octave shrinking in bass of smaller pianos

B. Pin setting

1. Study of pin resistance in pin block
 - a. Loose pins and various corrections
 - (1). Technique of setting a loose pin
 - b. Excessively tight pins
 - (1). Technique of setting a tight pin

c. Jumpy pins

(1). Technique of setting a jumpy pin

2. Study of sectional string tracing

a. Result of tuning pin operation on the three sections of string

C. Various uses of pianowire

1. Spring making

2. Drills'

3. Hooking tools

4. Special lock washers

D. Action

1. Inspection of damper and hammer springs

a. Replacement of hammer and damper springs

2. Tools for action repairing

a. Various sizes of screw driver blades

b. Awl

c. Screw holder

d. Tweezers

e. Punching lifter

f. Jack spring reamer

g. $5\frac{1}{2}$ " scissors

h. Duck bill pliers

i. Round nose pliers

j. Needle nose pliers

k. Curved needle nose pliers

l. Shank knurling pliers

- m. 5" vice grip
- n. C clamps and spring clamps
- o. Hammer
- p. Hand drill
- q. $\frac{1}{4}$ " electric drill
- r. Adjustable wrench
- s. Set of allen wrenches
- t. 6" hack saw
- u. Oiler
- v. Action cradle
- w. Action post extension
- x. Hammer head and butt extractor
- y. Cork bridle strap inserter
- z. Butt plate inserter

II. Evaluation

A. Oral

1. Uses of piano wire
2. Nomenclature of action repairing tools

B. Written

1. Tuning of temperament and octave stretching and shrinking
2. Demonstrate pin setting under all conditions of pin resistance
 - a. Demonstrate affect of sectional tension on pitch of string

3. Demonstrate various uses of piano wire
4. Demonstrate proper placement of hammer and damper strings
5. Demonstrate various action repairs

3rd Year --- 3rd Quarter

I. Specific Objectives

A. Tuning

1. Continued tuning of unisons, octaves and temperament
2. Special attention given to time element of tuning

B. Action

1. Examination and removal of spinet actions
 - a. Special attention paid to lifter assemblies
 - b. Use of action strap around neck to facilitate use of hands
 - c. Attention paid to dampers at breaks that may be damaged during removal and replacement
 - d. Usage of action cradle on workbench
2. Installation of bridle tapes
 - a. Method of installing cork type
 - b. Method of installing clip type
 - (1). Weight end of tape with small screw to facilitate location
3. Repair of sticker or replacement with adjustable sticker
 - a. Repair or replacement of tongues

4. Spacing of hammers
 - a. Positioning flange or use of electric pliers
5. Damper regulation
 - a. Elimination of side play
 - b. Correct spring tension
 - c. Damper square to spring
 - d. Texture of damper felt (soften or replace)
 - e. Methods of adjusting spoons
 - f. Familiarization with damper regulating tools
 - g. Methods of installing damper springs
6. Lubrication
 - a. Familiarization with types of lubricant used in piano
 - (1). Graphite base oil paste and stick
 - (2). Powdered or stick soapstone
 - (3). Vasoline, lanolin and talc mixture
 - (4). Machine oil
 - (5). Silicone spray
 - (6). Teflon spray
 - (7). Center pin lubricant
 - b. Location of all friction points in action and trap work
 - c. Various techniques of applying lubricant
7. Key work
 - a. Mending of broken key
 - (1). Gluing and veneering

(2). Insert method

(3). Application of hot instant setting glue
from glue gun

II. Evaluation

A. Oral

1. Dampers

a. Order of steps in regulating dampers

B. Performance

1. Tuning

a. Continuing demonstration of octaves, unisons
and temperament

b. Demonstration of increased speed tuning

2. Action

a. Demonstrate removal of spinet action

b. Demonstrate installation of different types
of bridle tapes

c. Demonstration of repair of sticker and tongue

d. Demonstrate spacing of hammers

e. Regulation of dampers

f. Demonstrate technique of applying lubricants

3. Key work

a. Mending of broken key

C. Written

1. Naming lubricants

3rd Year --- 4th QuarterI. Specific Objectives

A. Tuning

1. Continued tuning of uprights
2. Pitch raising (old piano)
 - a. Importance of inspection of bridge and pins
 - b. Tightening of plate bolts
 - c. Inspection of string necessary to minimize breakage
 - d. Student awareness in need for caution in raising pitch of old string
 - e. Increase in tension applied to single string of each note
 - f. Tuning unisons of entire piano
 - g. Need of repeated tunings to effect this gradual increase
 - h. Danger of over-tuning to avoid string breakage
 - i. Final fine tuning to A-440
3. Pitch raising (new piano)
 - a. Setting of rough temperament to A-445
 - b. Normal single string octave tuning below temperament through base
 - c. Sharpening octaves above temperament through F81 (single string)
 - d. Tuning unisons of entire piano
 - e. Fine tuning to A-440

4. Pitch lowering
 - a. Reverse of raising procedure
5. Tuning a spinet
 - a. Necessity of sitting down
 - b. Tuning compensation for inharmonicity of shorter strings
 - c. Increased shrinking of bass octaves
- B. Stringing
 1. Installation of string in area where overstringing covers bridge
 2. Proper procedure of measurement and ordering of bass string
 3. Sending sample to string maker
 4. Making a pattern of bass scale
- C. Trap
 1. Replacing pins, springs and rods
 2. Regulating pedal foot
 3. Location and lubrication of friction points
 4. Proper bridle strap regulation in conjunction with soft pedal regulations
- D. Flange bushing
 1. Tools and materials needed
 - a. Bushing drill
 - b. Razor blade
 - c. Scissors
 - d. Bushing cloth

- e. One 4" length of fine soft wire to be used as guide for bushing cloth.

2. Procedure

- a. Drill out old bushing.
- b. Rip bushing cloth to width.
- c. Cut tapered point on cloth.
- d. Insert wire near tip and twist in corkscrew manner.
- e. Thread cloth through both sides of flange.
- f. At appropriate point apply glue.
- g. Establish glued portion with wood.
- h. Trim surplus, insert pin through bushing and let dry.
- i. Neatly trim surplus with razor blade after removing pin.

E. Flange repairing

1. Tools and materials needed

- a. Common pins
- b. Music wire, diameter of common pin
- c. Glue
- d. Pin vise

2. Procedure

- a. Glue split surfaces.
- b. Reinforce with common pin.

F. Hammer assembly boring

1. Tools and materials needed
 - a. Drills, spur point - $7/32"$, $13/64"$, $3/16"$
 - b. Boring jig
 - c. Saw
 - d. Extractor
 - e. Knurling pliers
 - f. Glue
 - g. Appropriate size hammer shanks
 - h. Length gauge
 - i. Shank reducer
 - j. Bronze sleeves
 - k. Button thread
2. Procedure
 - a. Set up boring jig to sample.
 - b. Fit shank, glue together in action.
3. Shank mending procedure
 - a. Use of sleeves or thread

G. Chemicals

1. Pin tightener.
 - a. Knowledge of use of pin tightener
2. Wood alcohol and water
 - a. Knowledge of application
3. Hammer dope
 - a. Explain use of
4. Acetic acid
 - a. Explain use of
5. Moth exterminating chemicals

a. General knowledge of the moth

b. Flakes preferable to liquid

H. Polishes

1. Metal polish

a. Use for metal parts

2. Paste silver polish

a. For ivory and plastic key covering

II. Evaluation

A. Written

1. List all factors involved in pitch raising.

2. List chemicals and uses .

3. List polishes and uses .

B. Performance

1. Raise pitch of one piano one half tone.

2. Tune a spinet piano.

3. Install a string in area where overstringing covers bridge.

4. Measure a bass string in preparation for ordering.

5. Put trap work into working order.

6. Bush a flange .

7. Repair a flange.

8. Replace broken hammer shank.

9. Mend broken hammer shank .

10. Demonstrate uses of pin tightener .

11. Demonstrate uses of wood alcohol and water.

12. Demonstrate use of acetic acid .

13. Placement of moth flakes in key bed
14. Demonstrate polishing of brass parts.
15. Demonstrate polishing of ivories.

4th Year ---1st Quarter

I. Specific Objectives

A. String tracing (grand)

1. Examination of divisions of the plate
 - a. Various arrangements of tuning pins
 - b. Various arrangements of hitch pins
 - c. Styles of pressure bars
 - (1). Placement of agraffes
2. Tracing strings to tuning pins and making proper identification

B. Tuning (grand)

1. Proceed as with upright.
 - a. Awareness of ease of strip muting
 - b. Raise dampers while inserting strip mute to insure proper operation.
 - c. Tension regulator 'technique'
 - (1). Angle of regulator at two o'clock

C. Disassembly

1. Procedure of removing music rack
2. Procedure of removing key slip
3. Procedure of removing fall board
4. Procedure of removing blocks
 - a. Application of silicone to cheeks to facilitate removal of blocks

5. Procedure of removing action

a. Observance of extreme caution. Observe the following:

- (1). Plan a suitable surface for placement of action
- (2). Insertion of suitable tool through strings to insure hammers are at rest
- (3). Proper grasp of frame to eliminate possibility of end keys being depressed

D. Reassembly

1. Inspection of key bed to insure freedom of foreign objects
2. Raise dampers to facilitate complete insertion of action
3. Application of silicone to sides of blocks to facilitate insertion

E. Action

1. Study of spinet and grand action models to familiarize student with mechanics
2. Nomenclature of grand action

F. Spinet regulating

1. Refer to upright regulation with following exceptions:
 - a. Alignment of key fork
 - b. Regulation of grommets
 - c. Student awareness in difference in hammer travel

II. Evaluation

A. Performance (grand)

1. Demonstrate location of tuning pins
2. Strip mute entire piano and demonstrate tuning with proper tension regulator technique
3. Demonstrate removal and insertion of action
4. Regulate several notes on a spinet

B. Oral

1. Describe mechanics of grand action
2. Name parts of grand action

4th Year --- 2nd Quarter

I. Specific Objectives

A. Tuning

1. Continued grand and spinet'

B. Key leveling (grand)

1. Prepare key frame for leveling
2. Build up front rail pin of keys number one and eighty-eight with cardboard punchings so as to bring key to the specified height from key bed. The end keys with weights can now support the straight edge
 - a. The gap between balance rail and key will determine the proper thickness to be used on remaining balance pins

- b. Place felt punchings on all pins
- c. Weight rear of naturals and place in key frame
- d. The gap between straight edge and key top is measured with a feeler gauge. This measurement divided by one half determines the thickness of the proper punchings.
- e. Determine front rail punchings in usual way
3/8" or 7/16" dip
- f. Insert the two end sharps
 - (1). Build up front rail punchings so that when sharp is depressed it will be the thickness of a nickel above the natural
 - (2). Proper level is attained by placing appropriate paper punching under key on balance rail
 - (a). Proper balance rail paper punching will cause rear of sharp key to be even with adjacent key
 - (3). The two end sharps will act as guides for straight edge when held securely from rear
 - (a). Naturals should be removed when leveling sharps, making easier access to balance rail

(4). Tools required

(a). Straight edge (48")

(b). Tweezers

(c). Weights

(d). Punching lifter

C. Damper regulation

1. Ease guide bushing.
2. Secure position damper stop rail .
3. Secure pivot point of damper lever board .
4. Regulate sostenuto lips and assembly.
5. Square damper to string.
6. Voice if necessary.
7. Lubricate frictional points.

D. Lyre servicing

1. Tighten fasteners.
2. Remove lost motion in rods.
3. Lubricate frictional points.
4. Inspect for unglued and broken parts.

E. Rubber buttons and desk knobs

1. Familiarization of various types and location

II. Evaluation

A. Performance

1. Tuning
2. Key leveling
3. Damper regulating
4. Lyre repairs and adjustments

B. Oral

1. Nomenclature of damper assembly

4th Year --- 3rd Quarter

I. Specific Objectives

A. Tuning

1. Tuning limited to the field as class time must be confined to other work

B. Regulating action (grand)

1. Lubrication

- a. Enumerating all frictional points
- b. Type and application of lube

2. Preparing action

- a. Brush with suede brush:
 - (1). Whippen under felt
 - (2). Key frame cloth
 - (3). Hammer knuckle
 - (4). Drop screw cloth
 - (5). Damper lifter lifting felt
- b. Polish capstans
- c. Polish drop screw
- d. Alignment of hammer and whippen
- e. Traveling of hammer and whippen
- f. Tightening of all screws

3. Regulation (general)

- a. Adjust hammer rest rail to insure hammer travel of $1 \frac{7}{8}$ "
- b. Primary adjustment of lever spring to insure support of hammer
- c. Primary adjustment of capstan to insure hammer travel is $1 \frac{7}{8}$ "
- d. Adjust hammer rest rail to $\frac{1}{8}$ " below hammer shank

4. Regulation (repetition lever)

- a. Insert strip of fine sandpaper between knuckle and cradle
- b. Adjust lever so jack rubs against paper while moving jack tenon
- c. Raise lever through adjustment until rubbing ceases resulting in jack being $\frac{1}{64}$ " below lever top
- d. Positioning of jack
 - (1). Turn jack regulator button clockwise until hammer ceases to function
 - (2). Turn regulator button counter-clockwise to cause hammer to trip
 - (3). Turn additional two turns counter-clockwise

5. Regulation (fine)

- a. Adjust capstan so hammer shank $1/8$ " above hammer rest rail.
- b. Adjust repetition lever spring.
- c. Adjust let off to $1/8$ " below string. Use gauge for this.
- d. Adjust drop screw to $3/16$ " below strings. Use gauge.
- e. Adjust back check to $5/8$ " below strings. Use gauge.
- f. Adjust stop hook just below point of contact with hammer shank.
- g. The after touch is achieved by the use of a $.074$ " gauge block placed under the front rail punching. The jack should just trip when the key reaches the limit of travel. Altering of front rail punchings will achieve the desired effect.

C. Key leveling (vertical)

1. Same as grand except the use of weights is not required
 - a. The 2:3 key ratio in the vertical as opposed to the 2:1 ratio of the grand will require a slight modification in the system of determining the proper punchings.

D. Stringing

1. Replacing larger numbers of strings in all types of pianos

II. Evaluation

A. Written

1. List steps in preparing action for regulation
2. List order of steps and measurements in grand regulating

B. Performance

1. Prepare action section for regulating
2. Regulate action section in proper order
3. Level key section in upright

4th Year ---- 4th Quarter

I. Specific Objectives

A. Tuning

1. Limited to the field

B. Gauge

1. Proper placement and use of bearing gauge

C. Vibrations

1. Location of sympathetic vibrations outside of piano
2. Location of sympathetic vibrations inside piano
 - a. Foreign objects in area of sound board
 - b. String buzz and possible causes

- D. Familiarization with various names used by piano manufacturers
- E. Ground hammer installation
 - 1. Procedure of ordering
 - 2. Procedure of installation
 - a. Mount every other one using old hammer as model
 - b. Mount remaining hammers using new ones as guides
 - c. Shape tails to back checks
 - d. File to remove crown
 - e. Check position of hammer against strings to insure proper striking alignment
 - f. Voicing of hammers
 - (1). Voice for uniform tone
- F. Field trip
 - 1. Visit to major rebuilders to observe all phases of major overhaul
- G. Record keeping and proper business ethics
 - 1. Accurate accounting for benefit of income tax purposes
 - 2. Knowledge of business overhead and awareness of new tools and supplies
 - 3. Awareness of ethical advertising

II. Evaluation

A. Written

1. Make out an order for a set of hammers
2. Write a letter to a customer for non payment of bill
3. Report on field trip
4. List names used by manufacturers

B. Oral

1. General review of all repair and regulating procedures

C. Performance

1. Tune two pianos together
2. Demonstrate use of bearing gauge
3. Locate and correct a sympathetic vibration
4. Install six adjacent hammers

Resource Material

Faust, Oliver C. Tuner's Pocket Companion.
Boston: Tuner's Supply Co., 1949.

Howe, Alfred H. Scientific Piano Tuning and Servicing.
320 Crestwood Ave., Tuckahoe P. O., N. Y.
Grace E. Baker.

Howell, W. Dean. Professional Piano Tuning. Deep River,
Conn., New Era Printing Co., Inc., 1966.

The Piano Technician's Journal. 512 First Ave., North,
Seattle, Washington, 98109.

Sumner, W. L. The Pianoforte. London: MacDonald & Co.,
Ltd., 1966.

Travis, John W. Let's Tune Up. 8012 Carroll Ave.,
Tahoma Park, Md. 1968.

White, William Braid. Piano Tuning and Allied Arts.
Boston: Tuner's Supply Co., 1961.

Supply catalogues:

American Piano Supply, Box 1055, Clifton, N. J. 07014.

Ford Piano Supply Co., 242 E. 74th St., New York, N. Y.
10021.

Otto R. Trefz Jr. & Co. Inc., 1309 N. 27th St.,
Philadelphia, Pa. 19121.

Pacific Piano Supply Co., 11323 Vanowen St.,
North Hollywood, Calif. 91609.

Schaff Piano Supply Co., 2009-21 N. Clybourn Ave.,
Chicago, Ill. 60614.

Tuner's Supply Co., 94 Wheatland St., Somerville,
Mass. 02145.

AGENCY INFORMATION

A. INTRODUCTION

1. Name: The Connecticut Institute for the Blind
2. Address: 120 Holcomb Street, Hartford, Connecticut 06112
3. Telephone Number: Area Code 203 242-2274
4. Agency Head: Frank Johns, Jr.; Superintendent
5. Purpose: Founded in 1893, The Connecticut Institute for the Blind, a privately operated nonprofit corporation without capital stock, maintains a residential and day school for legally blind children. Though private in structure, the Institute performs a state service and cooperates with other agencies in the field of work for the blind.

B. OAK HILL SCHOOL

Located at 120 Holcomb Street, Hartford, Connecticut, Oak Hill is the only school in Connecticut devoted solely to the education and training of legally blind children, from five years of age to twenty.

C. GOVERNING BOARD

The governing board consists of not less than nine, nor more than thirty, nonpaid directors who must be residents of the State of Connecticut. Directors are elected each year by members of the Corporation.

D. OFFICERS

1968-1969	President.....The Reverend Robert L. Edwards
	Vice President....George C. Capen
	Secretary.....Theodore M. Maltbie
	Treasurer.....The Hartford National Bank and Trust Company

E. FINANCIAL SUPPORT

Approximately one half of the income of the Institute is derived from endowment funds, private gifts and fund-drive contributions. The state provides tuition for each Connecti-

cut student enrolled at Oak Hill and, at times, appropriates funds for specific projects, such as new buildings or equipment.

F. FUND-RAISING DRIVES

Each year, to cover the ever-growing budget of the Institute, additional funds must be realized to supplement income from the state, endowments and private gifts. To this end, a fund-raising drive is conducted in seventeen metropolitan cities and suburban areas throughout the state. Thus thousands of Connecticut residents are encouraged to assist The Institute in its services to blind children.

No promotional or professional group is associated in any way with its fund raising; nor is the Institute affiliated with any other fund drive.

G. ENROLLMENT

Oak Hill, a nonsectarian school, is set in the midst of 23 acres of beautiful land high in the hills of the northern section of Hartford. Enrollment varies from year to year due to changes in the general school population in the state, but usually approximates 130 pupils. Education, training, room and board are provided without charge to parents.

H. ELIGIBILITY

Any educable child, residing in Connecticut is eligible to apply for admission to Oak Hill if he is either totally blind or has corrected vision not exceeding 20/200 in the better eye, and is in such physical condition as to warrant special education. Out-of-state students may also apply.

I. CURRICULUM

Comparable to that of public schools, the curriculum includes kindergarten, 8 grammar grades and 4 high school grades. Besides the usual academic studies, required subjects include orientation and cane travel, typing, industrial arts, music, speech improvement, physical training, and home and child care for the girls.

For students with handicaps in addition to blindness, there are special classes and physical, occupational and speech therapy.

J. RECREATION

Recreational activities are stressed as an important part of the social adjustment program. Popular among blind students are roller and ice skating, tobogganning, bowling, wrestling, dancing, bingo and card games.

There are Boy Scout, Girl Scout, Cub Scout, and Brownie Troops, Clubs include Amateur Radio, 4-H, Key and Cheerleaders.

K. CAMP PROGRAM

The Institute sponsors and maintains a summer camping program for blind children at Harkness Memorial State Park in Waterford, Connecticut. It also directs a camping program for blind adults, which is sponsored by the State Board of Education and Services for the Blind.

L. PARENT-TEACHER GROUP

The state-wide Oak Hill Parent-Teacher Group works in close association with Oak Hill School during the school year. It conducts fund-raising projects to provide sums for special equipment, camperships and achievement awards.

M. LADIES VISITING COMMITTEE

The members of an auxiliary group, The Ladies Visiting Committee, supplement and enhance the Institute's program through the gift of their time, imagination, thoughtfulness and understanding. Their activities include an annual picnic for the children and staff at Oak Hill, the presentation of scholastic awards, and assistance with the fund drive.

N. VOLUNTEER PROGRAM

A volunteer program has been developed for the purpose of improving the quality of recreational services for children at Oak Hill. Fund-raising expenses are kept at a minimum through the services of volunteers. Volunteers provide religious education programs for all faiths.

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PIANO TUNING CURRICULUM
GUIDE.

(1968)

Date Due

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